Curriculum System Construction for Undergraduate Information Management Majors in the Big Data Era: A Postprint from the Perspective of Student Needs

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Abstract

[Purpose/Significance] Analyzing and exploring college students' intuitive perceptions of the curriculum system can facilitate the further development and refinement of curriculum reforms for information management majors in the big data era, thereby filling the research gap in curriculum system construction from the perspective of the student audience. [Method/Process] Employing grounded theory, this study conducted semi-structured interviews and performed open coding, axial coding, and selective coding on the collected data, generating 92 concepts, 17 subcategories, and 6 main categories, thus constructing a storyline concerning the undergraduate curriculum system for information management majors. [Results/Conclusion] The findings identify six key dimensions of curriculum system construction: curriculum content system, curriculum articulation, curriculum support system, classroom implementation effectiveness, student competency cultivation, and institutional objective factors. Based on the relationships among the main categories, recommendations are proposed to enhance curriculum articulation, promote disciplinary curriculum system construction, expand curriculum breadth and depth, improve the curriculum support system, and appropriately address institutional objective factors.

Full Text

Preamble

Curriculum System Construction for Undergraduate Information Management Majors in the Big Data Era: From the Perspective of Student Needs

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Abstract

[**Purpose/Significance**] Analyzing students' direct perceptions of the curriculum system can promote the further development and improvement of information management major reforms in the Big Data Era, filling the research gap in curriculum system construction from the perspective of the target audience. [**Method/Process**] Based on grounded theory, this study employed semi-structured interviews and conducted open coding, axial coding, and selective coding on the collected data, resulting in 92 concepts, 17 sub-categories, and 6 main categories, thereby constructing a storyline regarding the undergraduate curriculum system for information management majors. [**Result/Conclusion**] The study identified six key aspects of curriculum system construction: curriculum content system, curriculum coherence, curriculum support system, classroom implementation effectiveness, student competency development, and institutional objective factors. Based on the relationships among these main categories, recommendations were proposed to enhance curriculum coherence, promote disciplinary system construction, expand curriculum breadth and depth, improve the curriculum support system, and properly address institutional objective factors.

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1 Literature Review on Information Management Major Curriculum Systems

1.1 Overview of Information Management Major Curricula

Information management majors take information resources as their object of study, exploring the patterns of information resource value realization to ensure the functional utility and strategic value of information resources. This field encompasses a series of related specialties sharing common disciplinary missions and theoretical foundations, including library science, information science, archival science, information resource management, information management and information systems, and publishing and distribution. The arrival of the information society has made the development of the information industry and the social organization of information one of the most fundamental factors affecting social development. Information management majors are products of highly specialized social division of labor and will increasingly play a prominent role in helping social members organize information and promoting the development of the information industry in an informatized society. Meanwhile, with the accelerated cross-disciplinary integration under the global perspective in the Big Data Era, the ubiquitous presence of data and the trend toward refined social division of labor have prompted information management majors to continuously re-examine their original professional positioning, professional

education systems and curriculum construction, and the modernization of educational methods and approaches.

1.2 Research on Information Management Major Curricula

Curriculum system construction is the core of professional development and the key to talent cultivation in universities, reflecting guidance in four aspects: knowledge, competency, market, and future. Current academic research on information management major curriculum systems primarily focuses on three areas:

(1) Overall curriculum system construction. Tao Lei proposed constructing the basic framework of the information management and information systems (IMIS) major curriculum system based on disciplinary characteristics as the main consideration and social demand as a supplementary factor. Xiao Ximing et al. proposed a talent cultivation curriculum construction model for interdisciplinary talents adapted to public digital cultural services, with human-computer interaction at its core. Wang Jinna used the iSchool movement philosophy as a standard to conduct a comprehensive investigation of undergraduate curriculum settings for information resource management majors in China.

(2) Drawing on iSchool curriculum settings. Si Li et al. conducted a holistic examination of LIS school curricula, summarizing their characteristics from three aspects: curriculum structure, curriculum levels, and competency cultivation. Some scholars have selected individual typical LIS institutions such as the University of Illinois at Urbana-Champaign for case analysis to propose improvement suggestions for optimizing domestic library and information science curricula. Zhao Jiwen et al. also conducted specialized research on specific courses or categories, comparing their objectives, content, and formats. Particularly, current big data programs in U.S. universities are all closely integrated with existing majors, fully utilizing on-campus resource advantages, emphasizing extensive off-campus cooperation, and focusing on cultivating students' practical abilities and comprehensive qualities. Comparative analysis of Chinese and American information technology curriculum systems reveals that China still needs to strengthen MOOC emphasis, support for personalized and in-depth learning.

(3) Social employment demands for the major. Si Li et al. and Cao Jing et al. investigated the employment situation of iSchool graduates through website surveys, noting characteristics such as high employment satisfaction, which indirectly reflects the relative rationality of iSchool curriculum design. Wang Sufang et al., Zhao Quan, and Wei Xiaofei et al., starting from industry organization education accreditation standards, professional standards, and LIS job requirements, found that emerging theme courses such as data management and media management should still be added. Meanwhile, some scholars have studied domestic information management majors' curricula by comparing them with actual market demands for related professions, current employment

situations in major-relevant positions, and surveying teachers' and students' satisfaction with and attitudes toward the curriculum system.

Overall, current domestic research on curriculum system construction for information management majors in the Big Data Era is relatively comprehensive. However, regrettably, except for a few studies, most research relies solely on objective information such as course titles, content, or employment data for comparative analysis, neglecting subjective factors like audience attitudes. Few studies explore curriculum design from the perspective of student needs and recognition.

Undergraduate education is the foundational stage for cultivating students' comprehensive qualities and has a critical influence on their choice of future professional development directions. As the primary audience of professional education, students' direct perceptions serve as important feedback on curriculum effectiveness and construction level, representing one key basis for educational reform and curriculum optimization. As the ultimate recipients of curriculum system services and absorbers of professional knowledge, students' evaluations of curriculum system design can better reflect actual effectiveness than teachers' perspectives. Moreover, with keen awareness of the times, novel living habits, and their future roles as professional practitioners, students pay more attention to the practical utility of professional curriculum knowledge for future employment development. Their needs align with the demands of the era and they evaluate professional curriculum construction from the perspective of technological development. Additionally, unlike the traditional teacher perspective, the bottom-up student perspective can identify issues overlooked by conventional viewpoints, serving as a powerful supplement. Although undergraduate students' limited professional knowledge may lead to some extreme or unreasonable remarks, this does not diminish the significance of the student perspective for curriculum construction. Therefore, this paper analyzes and explores information management undergraduate students' cognitive perceptions of the curriculum system and its construction level from the student perspective, grounded in interview records, to investigate curriculum construction for information management majors in the Big Data Era.

2 Research Design for Curriculum Construction Based on Grounded Theory

2.1 Research Method

Grounded theory, as a theory-building approach in qualitative research, was proposed by sociologists A. Strauss and B. Glaser in 1967. Researchers generally begin without theoretical hypotheses, working directly from original data such as actual observations, interview materials, online cases, and documents. Through scientific logical deduction, induction, comparison, and analysis, they develop empirical generalizations that ultimately evolve into theory. Its main characteristic lies not in its empirical nature but in its abstraction of new con-

cepts and ideas from empirical facts. The basic approach includes generating theory from data, maintaining theoretical sensitivity, continuous comparison, theoretical sampling, flexible literature utilization, and theoretical evaluation.

Grounded theory originates from and faces practice, effectively capturing the dynamic relationship between meaning and process. Introducing it into the complex humanistic phenomenon of curriculum activities, especially for applied and practical majors like information management and library science, helps construct curriculum theory based on empirical data. This approach overcomes the disconnect between curriculum theory and practice from a holistic perspective, ensures the scientific rigor and practical relevance of curriculum theory, and promotes theoretical construction that adapts curricula to schools and students. Some scholars have already used grounded theory for curriculum system research, such as effective classroom teaching evaluation, online curriculum construction, and theoretical research on the mutual promotion of general and professional education.

This study adopts the procedural grounded theory represented by Strauss, using NVivo 11 for coding through open coding, axial coding, and selective coding. Through concept extraction, category refinement, and continuous comparative analysis, it establishes contextual relationships among different categories to form the final theory. The process is shown in Figure 1 [Figure 1: see original paper].

2.2 Research Subjects and Procedure

2.2.1 Online Survey Since the research subjects are undergraduates whose depth and breadth of understanding are limited, and because university level, region, and development direction significantly influence curriculum design, researchers first divided the country into six regions: North China, Southeast, Southwest, Northwest, Northeast, and Central China. However, due to practical difficulties in investigating representative universities in North China, especially Beijing, this region was replaced with South China. The study ultimately selected representative universities from each region—Wuhan University, Nanjing University, Sun Yat-sen University, Jilin University, Northeast Normal University, Yunnan University, Northwest University, and Shaanxi Normal University—to investigate and integrate their information management major curricula, constructing a basic curriculum framework for reference and helping research subjects understand the current state of information management major course offerings in China. The survey results are shown in Figure 2 [Figure 2: see original paper].

2.2.2 Interview Subjects and Process This study collected undergraduate information management students' views on the professional curriculum system through semi-structured interviews. Interview prompt questions are shown in Table 1 . Due to objective constraints such as time and space, interviews combined three forms: face-to-face, telephone, and instant messaging tools. Before

each interview, the concept of "information management major" and the scope of curriculum construction were explained to respondents. During interviews, the specific question order was slightly adjusted based on actual progress to ensure smooth conduct and result validity.

For interview subject selection, this study employed theoretical sampling, where researchers subjectively selected subjects most relevant to the research. Considering undergraduates' limited depth and breadth of understanding and individual differences, subjects were primarily chosen from high-achieving students with autonomous understanding of the curriculum system who had applied to a renowned institution's summer camp in the library and information science field. Selection balanced students from different regions, university levels, and majors to ensure sample representativeness and rationality. Drawing on Wang Wentao et al.'s approach, each interview participant was designated as Pn, where n indicates their interview order. Original interview files were named in the format "Pn/Participant Name/Interview Date/Interview Duration." Detailed participant information is shown in Table 2 .

3 Category Coding

"Coding, in classic grounded theory methodology, refers to the process of continuously comparing events with events and events with concepts to facilitate the formation of more categories, characteristics, and conceptualization of data." Based on grounded theory, this study used qualitative analysis software to analyze undergraduate students' views on information management major curriculum system construction in the Big Data Era through open coding, axial coding, and selective coding, followed by theoretical saturation testing.

3.1 Open Coding

Open coding involves line-by-line coding of data to conceptualize and abstract it layer by layer. Through continuous comparison, data and abstracted concepts are broken down, deconstructed, and reintegrated. During this process, researchers have no preconceived codes—they must maintain a completely open attitude. This study conducted open coding by extracting relevant statements, forming concepts, and refining categories. The steps were: Extract and code original statements relevant to the research theme line by line; Conduct preliminary conceptualization through analysis and comparison, expressing specific phenomena and ideas with concise words or sentences (A1…An); Further categorize based on preliminary concepts to achieve classification and integration of materials (B1…Bn). An example is shown in Table 3 . Ultimately, 92 preliminary concepts and 17 categories were extracted, detailed in Table 4 .

3.2 Axial Coding

Axial coding refers to discovering and establishing various connections among conceptual categories to demonstrate the organic relationships between differ-

ent parts of the data. It involves further classification and abstraction of the categories and concepts refined in open coding. By clarifying their logical relationships, six main categories were identified, as shown in Table 5 .

3.3 Selective Coding

In selective coding, researchers must excavate the core category from main categories and clearly articulate the relationships among developed main categories—the "storyline"—to supplement and improve inadequately developed categories. Through continuous comparative analysis of the six main categories, this study established their connections. First, "curriculum system construction" was identified as the core category. Second, other categories connected to the core category were determined, namely that curriculum system construction includes six aspects: curriculum content system, curriculum coherence, curriculum support system, classroom implementation effectiveness, student competency development, and institutional objective factors. This study constructed a curriculum system construction model, as shown in Figure 3 [Figure 3: see original paper].

The relational structure among main categories is as follows:

(1) Curriculum Coherence Curriculum Content System: Curriculum coherence and curriculum content system influence each other. The curriculum content system must be built upon curriculum coherence. Logical coherence determines the hierarchical distribution of curriculum content, while temporal tightness significantly influences the chronological distribution of curriculum content. The content system, in turn, reflects and strengthens coherence through its structure. Clear logical boundaries and tight temporal sequencing ensure curriculum breadth and depth. Simultaneously, appropriate breadth and depth must be maintained through coherence. Without clear logical and temporal connections between courses, students cannot apply knowledge to practical tasks or pursue independent in-depth study, as seen with isolated courses like XML Fundamentals or Information Economics. Truly applicable breadth and depth are relative and must be constrained through coherence—for example, determining that the program aims to cultivate front-end design talent would justify offering XML Fundamentals while reducing back-end database courses.

(2) Curriculum Content System → Curriculum Support System: The curriculum support system perfects, supplements, and implements the curriculum content system. The content system primarily manifests as the knowledge system taught by instructors—a static form of knowledge. The support system includes extracurricular assignments, online courses, professional practice, etc., which promote students' internalization of static knowledge through practice and reflection, transforming it into personal knowledge. Since instructor-taught knowledge is always limited, the support system is essential for encouraging students to explore knowledge independently and pursue in-depth learning in specialized fields.

(3) Institutional Objective Factors → Curriculum Coherence, Content System, Support System: Institutional objective factors influence curriculum coherence, content system, and support system. Some less-resourced institutions may reduce important course offerings due to limited faculty numbers, energy, or expertise, resulting in gaps in logically complete curriculum chains or inadequate breadth and depth. Traditional curriculum arrangement habits also make it difficult for new courses to integrate into the existing system, affecting logical continuity and temporal tightness. Limited teaching facilities and student numbers also restrict the content, location, and other aspects of assignments and practice, potentially failing to achieve desired outcomes.

(4) Institutional Objective Factors → Student Competency Development, Classroom Implementation: Institutional objective factors affect student competency development and classroom implementation effectiveness through material, personnel, and financial conditions. The institution's and faculty's development status influences students' cognitive horizons of the major. Inadequate teaching infrastructure—such as unavailable databases needed for retrieval courses, outdated computers, etc.—not only diminishes teaching effectiveness but also prevents students from truly mastering library practical skills and information retrieval/organization abilities. Excessive student numbers make it difficult for instructors to cover the entire class, limiting assignment and practice arrangements and thereby affecting innovation in teaching formats and interactivity.

(5) Curriculum Coherence + Content System + Support System → Student Competency Development + Classroom Implementation: Curriculum coherence, content system, and support system represent the content dimension of instruction, while student competency development and classroom implementation represent the effectiveness dimension. Instructional content influences both student competencies and immediate classroom effects.

3.4 Theoretical Saturation Test

This study randomly selected raw interview data from five participants for theoretical saturation testing. Through open coding, axial coding, and selective coding, no new categories or new relationships among main categories emerged, indicating that the research is theoretically saturated. Example from saturation test:

P09: "Platform-based public courses seem reasonable but are actually not. Because we're under the School of Public Management, we have courses like Public Management, but instructors come from other majors like administrative management or labor and social security. They always teach from their own perspective without connecting to our major's practical utility, resulting in weak connections with other professional courses. It's not very necessary unless they explain using specific library examples." (A20: Platform-based public courses require instructors from other majors to teach from this major's perspective com-

bined with practical cases—B3 Curriculum Discipline System—C2 Curriculum Content System)

4 Discussion and Implications

4.1 Enhancing Curriculum Coherence and Promoting Disciplinary System Construction (C2-C1)

Most universities have already formed a curriculum framework centered on core major courses and computer courses. Information management undergraduates generally believe that core major courses, computer application courses, research methodology courses, and frontier courses should be offered. Core professional courses such as Library Science Fundamentals, as key to establishing professional characteristics, should remain required courses. Over half of students believe current core professional course offerings are insufficient in quantity and class hours, while students from higher-level universities report excessive and disorganized assignments. For information science courses, students strongly demand information retrieval and informetrics courses, considering information analysis extremely important. However, interviews reveal considerable dissatisfaction with the teaching effectiveness of information retrieval and informetrics courses, with calls to change informetrics to a required major course and improve the effectiveness and depth of both courses. As a related discipline closely connected to information management, most students believe current computer courses are too superficial and cannot be truly applied in practice to transform into professional advantages. Elevating the status of computer courses and emphasizing data analysis courses has become a consensus among information management majors.

The long-term continuous development of traditional core courses has perfected their curriculum logic and tightness. However, emerging computer course systems show unsatisfactory coherence. For difficult computer courses, a stepped curriculum structure from basic to specialized, from easy to difficult, and from shallow to deep better facilitates student acceptance and mastery of information processing skills, providing essential capabilities for future practice. Meanwhile, the broadening of research fields in information management has also created knowledge chain breaks in emerging interdisciplinary courses, resulting in "isolated island" states. For example, students lacking mathematics and economics knowledge suddenly encounter information economics without subsequent related courses, creating knowledge gaps. Therefore, when designing curricula, attention must be paid to prerequisite courses and subsequent developmental courses to ensure continuity and hierarchy, helping students form comprehensive understanding and conceptual frameworks. Additionally, temporal tightness should be ensured—courses with related content should be arranged in consecutive semesters, as long intervals often reduce curriculum effectiveness and increase burdens for both students and instructors.

4.2 Expanding Curriculum Breadth and Depth While Ensuring Coherence (C1-C2)

Information management majors, as highly practical, applied, and interdisciplinary fields, theoretically involve extensive disciplinary knowledge—a characteristic and advantage that should be demonstrated. However, implementation has shown a polarized trend. Interviews reveal that some institutions' curricula are confined to the major itself, greatly limiting students' professional cognition and development directions. Other institutions force students to learn courses in all development directions, resulting in breadth without depth and excessive pressure that affects normal professional learning and holistic development. Currently, most universities, due to insufficient credits or faculty, treat professional electives as required courses, forcing students to take them. A few institutions allow free choice but restrict required credits per module, hindering students' desire for in-depth study in interested directions.

The cross-integration of information management majors with emerging and related disciplines is an inevitable trend. The necessity of offering interdisciplinary courses as electives is undeniable, but when designing such courses and learning models, considerations must be given to relevance, breadth, and depth of cross-disciplinary integration. Curriculum quality should be constrained through rigorous logic and temporal tightness to avoid situations of breadth without depth or excessive pressure.

For well-resourced institutions, before setting courses, full consideration and planning must be given to the relevance of various interdisciplinary courses to the major to constrain curriculum breadth. Subsequently, based on different development directions of the major, numerous interdisciplinary electives can be offered—for example, IMIS majors could offer economics management and biomedical courses; library science could offer philology, communication, and history; archival science could offer history and document studies. While stipulating overall credits required for elective modules, students should be allowed to freely choose courses for broad exploration or in-depth study according to their interests, facilitating the cultivation of both generalists and specialists.

For departments with insufficient faculty and resources or constrained by institutional development directions, they should fully consider teaching depth and applicability according to a determined cultivation direction, systematically offering courses such as medical information management, while using the curriculum support system to compensate for students' lack of understanding of other professional directions.

4.3 Perfecting the Curriculum Support System to Promote Content System Construction (C5-C2)

The curriculum support system includes theoretical supplementation through online courses and practical supplementation through hands-on teaching—important components of curriculum system construction that are often

overlooked by curriculum designers.

With MOOC platforms and courses gaining worldwide recognition, students' willingness to adopt online courses is growing stronger, while some institutions have begun introducing video courses and MOOCs for technical and frontier courses. Due to concerns about assessment systems and real-time interactivity, most students support integrating online courses into the current curriculum system but believe face-to-face instruction should remain the mainstream teaching model, with online courses serving as important supplements. Instructors should communicate more with students through casual conversations or extracurricular assignments, recommending excellent major-related online courses for preview and review, while conducting rich interactive formats like group discussions offline or including online course knowledge in final exams to promote online-offline integration and enhance learning initiative. Additionally, online courses can compensate for limitations in institutional curriculum offerings, insufficient faculty, and course cancellations due to personnel changes, broadening the breadth and depth of students' self-directed learning. For example, institutions with strong MOOC development capabilities can have instructors upload preview materials, course videos, and assignments according to course progress, and monitor class assignment completion through student ID systems to fully leverage online courses' supportive role.

Practical components of professional courses are crucial curriculum supplements that promote learning application and cultivate practical abilities, including assignments, experiments, internships, field trips, surveys, graduation theses/designs, and other social practices. Overall, practical teaching in information management majors remains insufficient in quantity and emphasis. Extracurricular assignments, as important supplements to classroom knowledge, are vital for improving teaching quality and deepening student understanding. Most respondents support instructors assigning homework and believe current assignment loads are inadequate. While students from stronger institutions report heavy workloads and high pressure, all respondents unanimously recognize the positive role of extracurricular assignments, with some stating their professional competencies primarily derive from assignments and professional practice rather than classroom instruction. This demonstrates the necessity and urgency of assignments in supplementing classroom content and cultivating students' knowledge structure and application abilities. Institutions should increase assignment quantities for information management courses while reasonably coordinating assignments across different courses to balance quality. Instructors should guide students to continuously explore knowledge and apply learning through flexible assignment formats, leading them toward proactive and inquisitive learning paths to comprehensively enhance professional literacy.

Regarding practice, prominent issues include insufficient field trips, limited scope, or inadequate instructor guidance during professional internships, preventing practice from achieving expected outcomes. Institutions must further

increase the proportion of practice in the curriculum system, emphasizing assessment, evaluation, and summarization of practical activities to ensure students possess both solid theoretical foundations and strong problem-solving abilities.

4.4 Addressing Institutional Objective Factors to Optimize Content and Effectiveness (C4-Ca)

Institutional objective factors, including material, personnel, and objective spiritual conditions, are important yet easily overlooked in traditional teacher-perspective curriculum design. However, the student perspective clearly reveals their significant impact on learning content and effectiveness.

Backward teaching infrastructure is a crucial material aspect, 主要指 computer hardware and software. Outdated computers and poor network conditions diminish teaching effectiveness and instructor leadership, while 无形中 shortening learning time for computer courses and eroding learning enthusiasm and exploratory motivation. The absence of necessary learning resources—such as databases needed for retrieval courses, advanced cataloging practice systems, or suitable internship placements—also prevents students from developing library practical skills and various information processing abilities through the curriculum support system.

Faculty and students, as the two main subjects of curriculum construction, are also part of institutional objective factors. Due to information management majors being relatively unpopular, faculty numbers are disproportionately small compared to students, creating imbalanced student-teacher ratios. When major enrollment is excessive, instructors struggle to coordinate assignments and practice arrangements, unable to attend to every student's learning effectiveness and competency development. Additionally, some students' low participation and motivation render instructors' efforts to enliven classroom atmosphere and improve teaching effectiveness ineffective. For instance, one institution's instructor attempted to introduce flipped classroom teaching, but students' low completion rates caused the initiative to fail. Furthermore, communication problems among faculty severely affect curriculum coherence. Interviews revealed that when two courses have overlapping or prerequisite relationships, instructors often either repeatedly cover the same content extensively or both assume the other has covered it, resulting in knowledge gaps and inefficient learning.

Institutional traditions also influence curriculum content and effectiveness to some extent. Although information management majors' research objects have shifted from traditional documents to information resources, undergraduates still perceive it as a relatively traditional discipline. This perception connects to the conservative ideology prevalent in some universities that leads to decade-old curriculum settings and teaching content. Under such ideologies, some instructors rigidly adhere to outdated teaching plans, continuing to employ rote, cramming teaching models that severely hinder students' knowledge absorption and understanding.

Institutional objective factors are difficult to change due to various subjective and objective conditions and require macro-level control with appropriate flexibility to achieve ideal curriculum construction outcomes. For unchangeable material factors, solutions should be sought through curriculum support systems like online courses and field teaching. Overall, institutions must establish standardized, institutionalized curriculum evaluation, management, and development mechanisms, promptly adjusting curriculum offerings and teaching content according to trends and student feedback, while controlling student and faculty quantity and quality at the recruitment and personnel levels.

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Note: Figure translations are in progress. See original paper for figures.